

Learning How to Solder Training Kit

This kit is designed to provide real world soldering challenges using an industry standard PCB. Not only does it contain both through-hole and surface mount technology (SMT) components, it also has a ground plane that will require additional time to allow the solder to flow through the board. The placement of the surface mount parts in close proximity to each other is consistent with today's soldering challenges. By learning how to overcome the challenges, you will be able to build more advanced circuitry.

What you will need to assemble this kit:

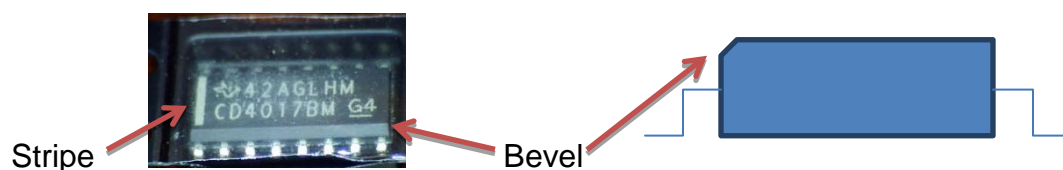
Soldering Iron	Solder (flux cored, 0.020" diameter)
Small and Medium Chisel tip	Isopropyl alcohol
Kim wipes	Liquid flux –no clean
Diagonal cutters	Needle nose pliers
ESD wrist strap w/proper grounding	

9 volt battery (Kit does NOT include battery)

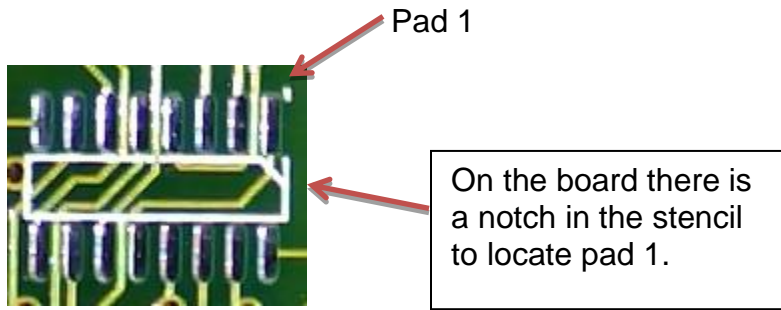
To assemble the kit, first make sure the inventory list matches the parts included. Next, wipe the board clean with isopropyl alcohol to remove any finger prints or contamination.

Liquid flux is used to help the soldering process by applying a small amount to the area being soldered. The flux helps to clean the oxidation off of the copper and to protect it until the solder is added.

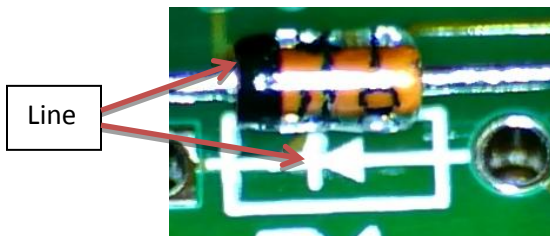
Some of the parts in the kit have to be oriented correctly. For the IC's there is a stripe on one end or the part may be beveled down one side.



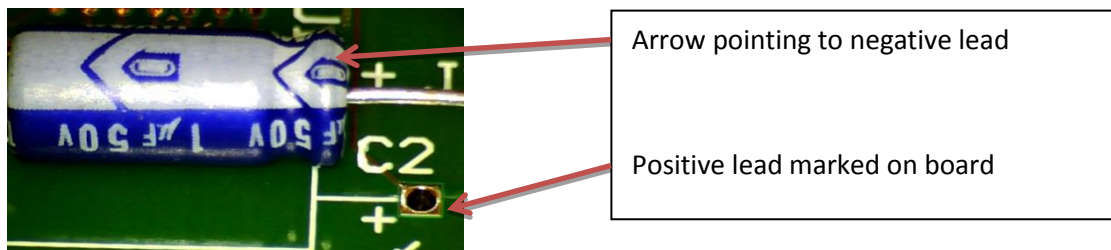
Learning How to Solder Training Kit



On the diodes there is a line on one end that will be placed on the same side as the line on the board.



For the capacitors, there is an arrow on the body that points to the negative lead.

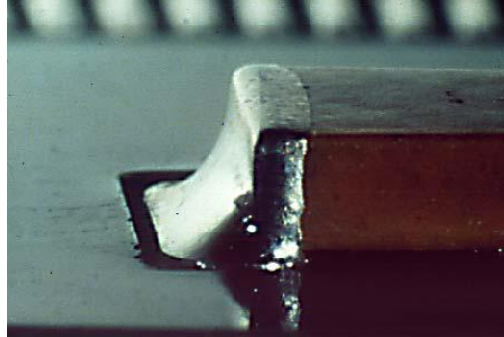


Learning How to Solder Training Kit

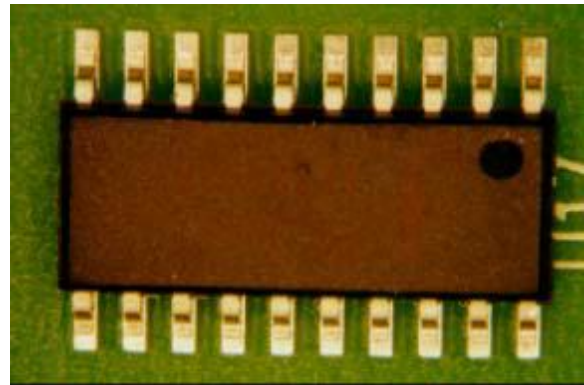
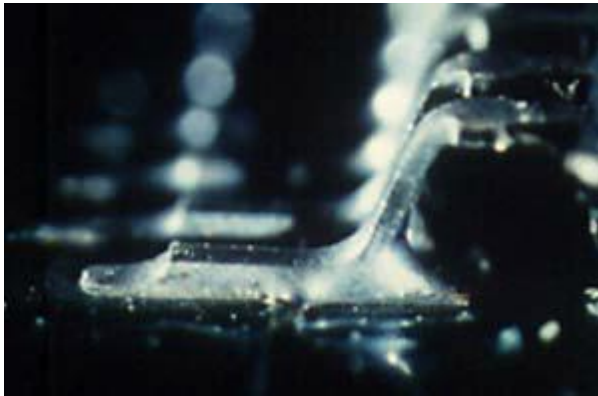
Soldering SMT parts

To solder SMT parts, position the part on the board- paying attention to proper orientation. Apply a small amount of flux to the leads and using a small tip such as a 1/16th or 1/32nd chisel tip tack one lead or side to the board. Confirm the part is positioned on the pads and finish soldering all the remaining leads.

Chip style components properly positioned and good solder fillets.



IC's soldered and positioned. Solder should not completely cover the lead or touch the body of the component.



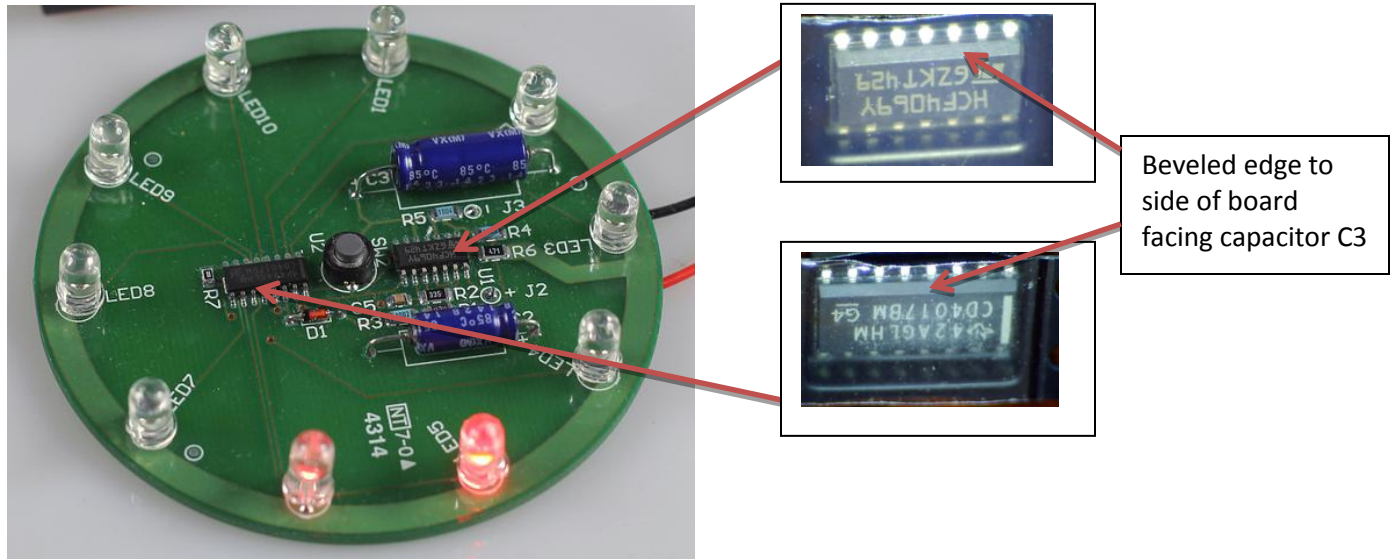
Soldering demo's can be found by going to www.solder.net/technical-info/soldering-tips/ or on You Tube by searching for SolderingGeek.

Example of soldering Surface Mount IC's <http://youtu.be/lauw0bSe-Cw>.

Learning How to Solder Training Kit

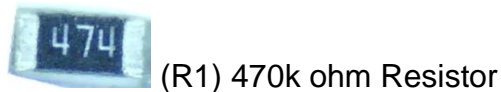
Assembling the kit

Locate U1 on the board and install IC4069 (14 leads) with the beveled side facing pad 1. Tack solder one lead to the board and verify that the leads are placed on top of the pads on both sides. Finish by putting a small amount of liquid flux on the leads and soldering all leads, making sure to solder the lead that was tacked.

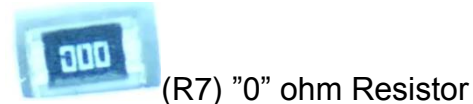
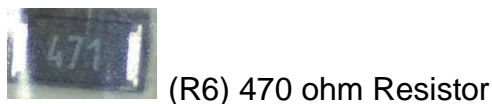
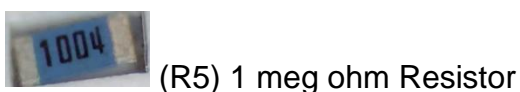
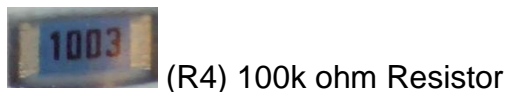
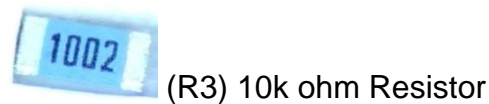
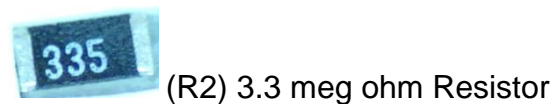


Locate U2 and install IC 4017 (16 leads) in the same manner. The stripe will be facing the center of the board.

Next, install the resistor R1 (474) by either tacking one side and then soldering the other side before finishing the soldering of the first side. As an alternative, place a small amount of solder on one pad. While holding the resistor in place with the tweezers, re-melt the solder to form the fillet. Then solder the second side.

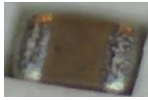


Repeat these steps for the remaining resistors R2 through R7.



Learning How to Solder Training Kit

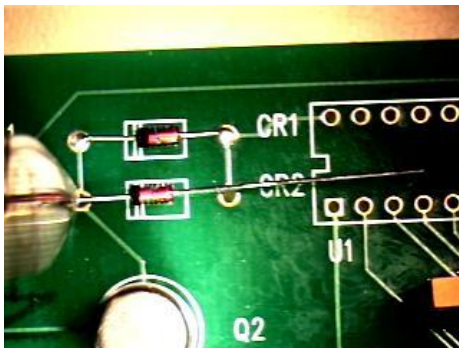
Soldering the surface mount capacitor is the same as soldering the resistors. Solder capacitor C5.



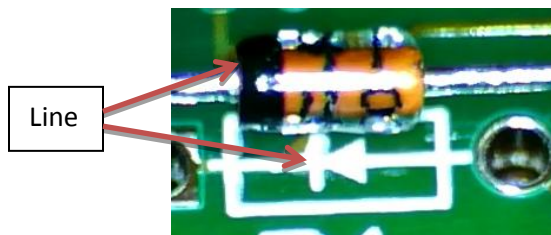
This completes the installation of the SMT parts. The remaining parts are all Through-Hole.

Installing Through-Hole Components

To install these parts, you will need to form (bend) the leads to allow them to be inserted into the holes on the board. You can use needle nosed pliers to bend the leads 90 degrees or you can use a lead forming tool. To use the needle nosed pliers start by positioning the part between the holes and grasping one lead where it crosses over the hole. Bend the lead to a 90 degree angle and place it into one of the two holes. Now repeat the first step for the second lead. Once both leads are formed, the part should rest on the board with the leads inserted into the holes with no stress on the leads. If the part will not go all the way down to the board you can gently bend one side out about 45 degrees and re-bend it closer or further from the body of the component to adjust the fit.



Install the diode D1 (1N4148) being sure the black stripe is on the same side as the line on the board.



To solder in place, first cut the leads protruding from the reverse side of the board to approximately 2mm or the thickness of a nickel. Then bend the leads outwards from the hole to approximately a 45 degree angle to help hold the part in the board while soldering.

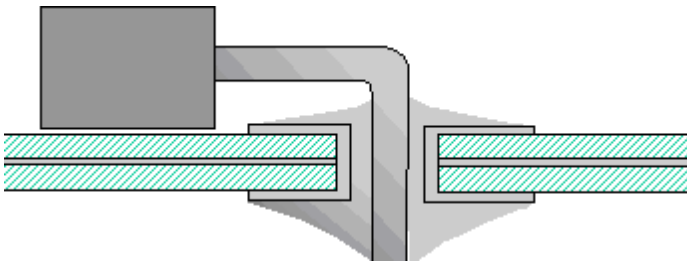
Learning How to Solder Training Kit



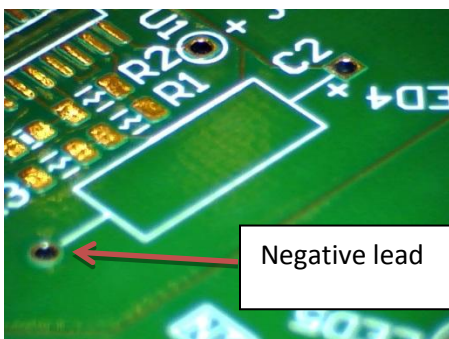
Soldering the part begins by applying a small amount of flux on the pad and placing the iron in contact with both the lead and pad surface. Apply solder to where the lead, pad and iron meet and flow a small quantity of solder to make the connection. Remove the iron and solder at approximately the same time to help prevent points or peaks from forming.



Soldering should only be done from the termination side of the board. Solder will flow to the opposite side to form the fillet around the lead.



Install the two capacitors, C2 and C3, following the same techniques. Be sure to place the negative lead in the hole without the plus symbol beside it.



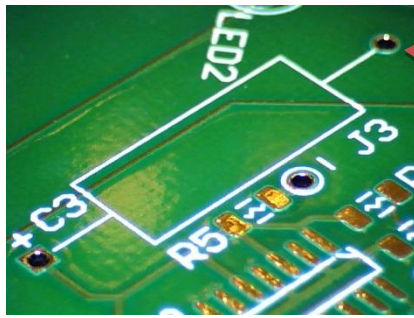
Beveled side is positive

Negative lead



(C2) 1uf Capacitor – Axial leaded

Learning How to Solder Training Kit

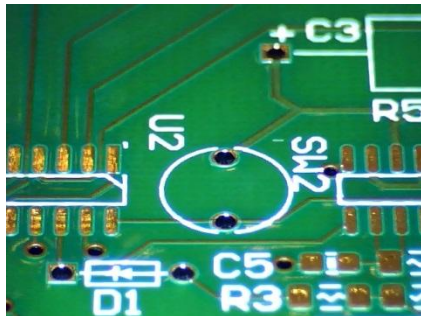


Negative lead



(C3) 47uf Capacitor – Axial leaded

Solder the switch SW2 to the location marked on the board.



Switch, Momentary – Radial leaded

The 10 LED's are soldered with the shorter lead placed in the hole to the outside of the board.



LED – Radial leaded (10ea.)

Last, solder the battery clip to the board at locations J2 and J3.

J2 Positive wire (Red).

J3 Negative wire (Black)

9v Battery clip

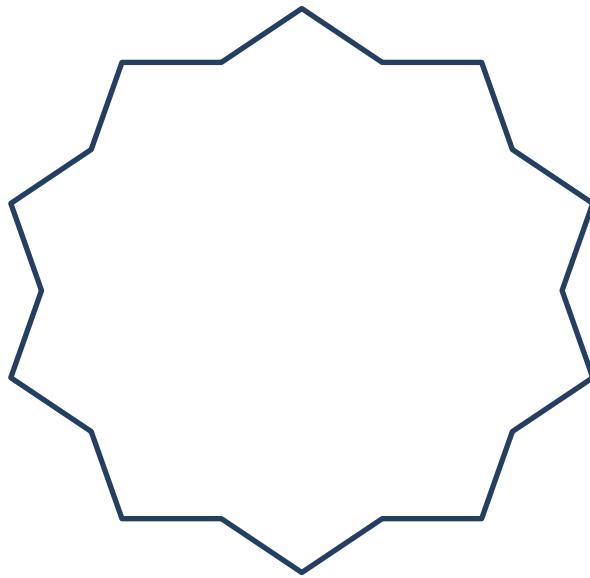


Install 9v battery (not included) onto battery clip. Depress switch to see LEDs light in order and then stop on one randomly.

Learning How to Solder Training Kit



Decision maker - Overlay



Blank Overlay